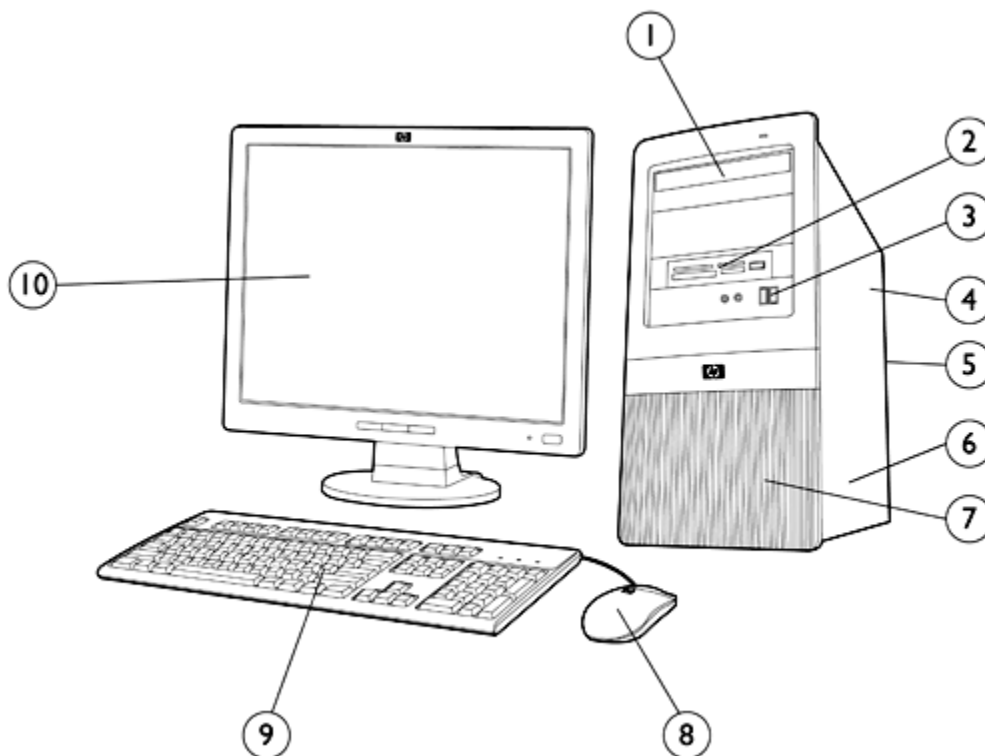


Overview

**HP recommends
Windows Vista® Business**

Microtower



- | | |
|--|---|
| 1. (2) external 5.25" drive bays for optional optical drives | 6. (1) full-height PCI 2.3 slot, (2) PCIe x1 slots, (1) PCIe x16 slot |
| 2. (1) external 3.5" drive bay for optional media reader or diskette drive | 7. (2) internal 3.5" drive bays |
| 3. (2) USB 2.0 ports, audio ports | 8. PS/2 Scroll Mouse |
| 4. 300-watt max power supply | 9. HP Standard Keyboard |
| 5. (4) USB 2.0 ports, (2) PS/2, (1) RJ-45, (1) VGA, (1) audio in – (1) audio out – (1) MIC | 10. Monitor (sold separately) |

Overview

At A Glance

- Intel® Core™ 2 processors, Intel Pentium® processors, or Intel Celeron® processors
- Choice of operating systems:
 - Genuine Windows Vista Business 32
 - Genuine Windows Vista Home Basic 32
 - Genuine Windows Vista Business downgrade to Genuine Windows XP Professional installed
 - Genuine Windows Vista Ultimate 32 (English Only)
 - FreeDOS
- Intel G33 Express Chipset
- Intel I/O Controller Hub 9 (ICH9R)*
- Intel Graphics Media Accelerator 3100
- PCI and PCI Express I/O buses
- Serial ATA controller
- USB 2.0 support
- Realtek 8111C-GR Gigabit Ethernet controller
- Choice of hard drives and optical drives
- DDR2 SDRAM system memory
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions and exclusions apply.

* RAID mode not supported

Standard Features and Configurable Components

Processor and Speed

One of the following

Intel Celeron Processors

- Intel Celeron 420 Processor (1.60-GHz, 512-KB L2 cache, 800-MHz FSB)
- Intel Celeron 430 Processor (1.80-GHz, 512-KB L2 cache, 800-MHz FSB)
- Intel Celeron 440 Processor (2.00-GHz, 512-KB L2 cache, 800-MHz FSB)
- Intel Celeron Dual Core E1200 Processor (1.60-GHz, 512-KB L2 cache, 800-MHz FSB)

Intel Pentium Processors

- Intel Pentium Dual Core E2140 Processor (1.60-GHz, 1-MB L2 cache, 800-MHz FSB)
- Intel Pentium Dual Core E2160 Processor (1.80-GHz, 1-MB L2 cache, 800-MHz FSB)
- Intel Pentium Dual Core E2200 Processor (2.20-GHz, 1-MB L2 cache, 800-MHz FSB)

Intel Core 2 Processors

- Intel Core 2 Duo E4500 Processor (2.20-GHz, 2-MB L2 cache, 800-MHz FSB)
- Intel Core 2 Duo E4600 Processor (2.40-GHz, 2-MB L2 cache, 800-MHz FSB)
- Intel Core 2 Duo E4700 Processor (2.60-GHz, 2-MB L2 cache, 800-MHz FSB)
- Intel Core 2 Duo E6550 Processor (2.33-GHz, 4-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Duo E6750 Processor (2.66-GHz, 4-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Duo E6850 Processor (3.00-GHz, 4-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Duo E8200 Processor (2.66-GHz, 6-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Duo E8400 Processor (3.00-GHz, 6-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Quad Q9300 Processor (2.50-GHz, 6-MB L2 cache, 1333-MHz FSB)
- Intel Core 2 Quad Q9450 Processor (2.66-GHz, 12-MB L2 cache, 1333-MHz FSB)

NOTE: Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families.

Operating Systems and Application Software

(availability varies by region)

- Genuine Windows Vista Ultimate 32 (English Only) *
- Genuine Windows Vista Business 32*
- Genuine Windows Vista Home Basic 32*
- Genuine Windows Vista Business downgrade to Genuine Windows XP Professional installed*†
- Free DOS

* Certain Windows Vista product features require advanced or additional hardware. See: <http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx> and <http://www.microsoft.com/windowsvista/getready/capable.mspx> for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: <http://www.windowsvista.com/upgradeadvisor>

† Windows Vista Business disk also included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order annually at least 25 customer systems with the same custom image.

- Microsoft Office 2007 Basic
- Microsoft Office 2007 Small Business
- Microsoft Office 2007 Professional
- Microsoft Works 8.5
- Roxio Easy Media Creator 9.x**
- Intervideo WinDVD Player 5.x**
- Symantec AntiVirus 10
- Sun Java Runtime Environment



Standard Features and Configurable Components

AOL Toolbar

** Supporting software available with certain optical drive configurations

Hard Drives

- 80-GB Serial ATA 3.0-Gb/s NCQ, Smart IV (7200 rpm)
- 160-GB Serial ATA 3.0-Gb/s NCQ, Smart IV (7200 rpm)
- 250-GB Serial ATA 3.0-Gb/s NCQ, Smart IV (7200 rpm)
- 500-GB Serial ATA 3.0-Gb/s NCQ, Smart IV (7200 rpm)

System Memory

- 512-MB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 512MB)
- 1-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 1GB)
- 2-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 1GB)
- 2-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (1 x 2GB)
- 3-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (3 x 1GB)
- 4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 1GB)
- 4-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (2 x 2GB)
- 8-GB DDR2 Synch DRAM PC2-6400 (800-MHz) Non-ECC (4 x 2GB)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

Storage –

One or more of the following (see Storage section below)

Diskette Drive

- 1.44-MB Diskette Drive

Media Reader

- HP 16-in-1 Media Reader and additional USB 2.0 port

Optical Drives (Serial ATA)

- SATA DVD-ROM Drive
- SATA CD-RW/DVD-ROM Combo Drive
- SATA SuperMulti LightScribe DVD Writer Drive

Input Devices

Keyboard – One of the following

- HP PS/2 Standard Keyboard
- HP USB Standard Keyboard
- Mouse** – One of the following
- PS/2 2-Button Optical Scroll Mouse
- USB 2-Button Optical Scroll Mouse
- USB 2-Button Laser Mouse

Audio

- Realtek ALC888S High Definition audio codec
- 3D audio compliant and HD Audio compatible
- Internal PC speaker

Standard Features and Configurable Components

Communication	Integrated Realtek 8111C-GR GbE Ethernet Controller Intel PRO/1000 PT Gigabit PCIe Controller (full height) – optional Agere 56K PCI Modem – optional HP Wireless A+G PCI Card (full height)
Graphics	Intel Graphics Media Accelerator 3100 – integrated NVIDIA GeForce 8400 GS (256MB) Single Head PCIe x16 – optional* HP ADD2 SDVO PCIe x16 DVI-D Adapter – optional ATI Radeon HD 2400XT (256MB DH) PCIe x16 – optional * 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.
Miscellaneous	HP FireWire / IEEE 1394 PCI Card (full height) HP Serial/Parallel PCI Card (full height)

System Details

Base Unit

- Micro ATX microtower chassis, including power supply and front bezel
- Five (5) drive bays and four expansion slots
- Microsoft operating system CD – optional
- Active type heatsink
- 92 x 92 x 25 mm chassis fan
- System board with Intel G33 Express chipset, Intel I/O Controller Hub 9R (ICH9R), Realtek RTL8111C-GR GbE Ethernet controller, Intel GMA 3100 graphics, and Realtek audio, (1) full-height PCI 2.3 slot, (2) PCI Express x1 slots, (1) PCI Express x16 slot, (4) DDR2 DIMM memory slots, (4) Serial ATA data connectors
- Product documentation on CD
- HP system restore CD – optional
- Power cord

Slots	PCI	One (1) full-height PCI 2.3 slot on PCA Two (2) full-height PCI Express x1 slots on PCA One (1) full-height PCI Express x16 slot on PCA (for graphic cards)
	Memory Expansion	Four (4) DDR2 SDRAM DIMM slots (8 GB maximum memory support)
NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.		

Bays	Internal	Two (2) 3.5"
	External	Two (2) 5.25" One (1) 3.5"

USB Support	EHCI high-speed USB 2.0 controller
	Two (2) front ports; Four (4) rear ports, Two (2) internal ports on motherboard

Interfaces (Legacy)	One (1) PS/2 keyboard port
	One (1) PS/2 mouse port
	One (1) analog VGA video port
	One (1) line in; one (1) line out; one (1) mic in
	One (1) RJ45 network port

Weight & Dimensions	Chassis Dimensions	15.16 x 7.28 x 16.38 in. with bezel (385 x 185 x 416 mm)
		14.88 x 6.50 x 16.10 in. without bezel (378 x 165 x 409 mm)
	Packaged Dimensions	19.13 x 21.875 x 10.13 in (L x W x H) 490 x 556 x 257 mm
	System Weight	22.4 lb (10.2 kg)
	Shipping Weight	30.8 lb (14.0 kg)

System Details

Technology and Features	Memory Type	PC2-6400 DDR2 SDRAM (800MHz) non-ECC Up to 8-GB maximum system memory supported
	NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.	
	Hard Drive Interfaces Supported	Serial ATA

Chassis	Front Panel	Power button Power On LED HDD Activity LED
	Cooling Solutions Supported	Power Supply Fan (variable speed) Active heatsink (variable speed) Chassis fan
	Slots Supported	Four (4) full-height expansion slots
	Front I/O	Two (2) USB 2.0 ports
	Rear I/O	Standard Micro ATX I/O connectors, including four (4) USB 2.0 ports
	Drive Bays	Two (2) 5-1/4" external One (1) 3-1/2" external Two (2) 3-1/2" internal
	Internal Speaker	Standard
	Security	Padlock loop Kensington Lock Support
	Power Supply	300-watt ATX Power Supply – PFC/non-PFC with a 115v/230v line switch (varies by country/region)

Unit Environment and Operating Conditions

General Unit Operating Guidelines		
<ul style="list-style-type: none">Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.Leave a 4 in (10.2 cm) clearance on all vented sides of the computer to permit the required airflow.Never restrict airflow into the computer by blocking any vents or air intakes.Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.		
Temperature Range	Operating	50° to 95° F (10° to 35° C)
	Non-operating	-22° to 140° F (-30° to 60° C)
Relative Humidity	Operating	10% to 90% (non-condensing at ambient)
	Non-operating	5% to 95% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating	10,000 ft (3048 m)
	Non-operating	30,000 ft (9000 m)
NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 10,000 ft (3000 m) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.		



System Details

System Board	Processor	Socket T; LGA775 industry standard Micro ATX form factor Support single Intel Core 2 Duo or Quad, Celeron 4xx or Dual Core
	PWM	ON NCP5387 – 3 phase
	Chipset	Intel G33 Express Intel I/O Controller Hub 9 (ICH9)
	Super I/O	ASUS F8000
	Front Side Bus Frequency	800/1066/1333 MHz
	Memory	DDR2 SDRAM 4 x DIMM slots
	Clock Generator	IDT CV1908PAG
	Integrated Graphics	Intel Graphics Media Accelerator (GMA) 3100
	Audio	Realtek ALC888S HD Audio compatible codec with two channel audio 3D audio
	LOM	Realtek RTL8111C-GR GbE Ethernet controller
	Storage	Four Serial ATA interfaces
	Expansion Slots	1 x PCI 2.3 slot 2 x PCI Express x1 slots 1 x PCI Express x16 slot
	BIOS	SPI EEPROM
	Industrial Standard	PCI 2.3 compliant USB 2.0
	Rear Side I/O Ports	1 x PS/2 keyboard port 1 x PS/2 mouse port 4 x USB 2.0 ports 1 x RJ-45 10/100/1000 port 1 x D-sub 15 pin analog VGA port 3 x audio ports
	On Board I/O Interfaces	1 x ATX power connector 1 x +12V power connector 1 x Floppy connector 1 x Front panel connector, Switch, LED (ON/Flash/OFF) 2 x Fan headers for CPU, chassis, with voltage/fan speed control 1 x header to support 2 USB 2.0 ports at front side 1 x header to support 2 front (Headphone/Mic) audio ports 1 x header to support USB media reader
	Board Size	Micro-ATX, PCB Size: 9.6 x 9.0 in (24.38 x 22.86 cm) 4-layer PCB with green color
	Additional Features	<ul style="list-style-type: none">● Bootable without keyboard, mouse or monitor● Keyboard/mouse/USB wake up● Support S1, S3, S4 and S5● ACPI status● Hardware monitor capability● CPU fan speed control

System Details

Network Interface	Integrated Realtek 8111C-GR GbE Ethernet Controller	Hardware Highlights Features	PCIe x1 interface 10-Mbps, 100-Mbps and 1000-Mbps operation Crossover detection and auto-correction Wake-on-Lan and remote Wake-up
	Intel PRO/1000 PT Gigabit PCIe Adapter	Hardware Highlights Features	PCI Express interface 10-Mbps, 100-Mbps and 1000-Mbps operation

Wireless Wireless A+G PCI Card (full height bracket)

Power Supply	<ul style="list-style-type: none">• ATX Power Supply – Passive PFC/non-PFC with a 115v/230v line switch• Passive Power Factor Correction (PFC) – with line switch set to 230V – No PFC in 115V line switch position• 90 to 140VAC, or 180 to 264VAC operating voltage range• 100 to 127VAC, or 200 to 240VAC rated voltage range• 50-60 Hz rated line frequency• 47-63 Hz operating line frequency range• 300 watt maximum rated power• 80-mm power supply fan – variable speed for optimum acoustics
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Power Conservation 'Energy Saver'	<ul style="list-style-type: none">• APM 1.2 support• Screen blanking• Hard drive 'Idle' mode• System Idle mode• ~2 watt power consumption in ES mode – suspend to RAM (S3) (instantly available PC)• Processor/Cache memory power-down (S3)
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System Environmental Specs	<ul style="list-style-type: none">• Values are subject to change without notification and are for reference only.• Performance of system, options, and ancillary equipment will vary depending on the system configuration.• Levels presented do not account for non-HP/Compaq installed hardware.		
	Ambient Air Temperature	Operating	50° to 95°F (10° to 35°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 8000 ft (2500 m), no direct sustained sunlight. Maximum rate of change is 77°F/Hr (25°C/Hr). The upper limit may be limited by the type and number of options installed.
		Storage	-22° to 140°F (-30° to 60°C) – Maximum rate of change: 410°F/Hr (210°C/Hr).
	Humidity	Operating	10% to 90% relative humidity (Rh), 86°F (30°C) maximum wet bulb temperature, non-condensing
		Storage	10% to 95% relative humidity (Rh), 101.66°F (38.7°C) maximum wet bulb temperature, non-condensing
	Altitude	Operating	0 to 10,000 feet (0 to 3048 meters) – This value may be limited by the type and number of options installed. Maximum allowable



System Details

		altitude change rate is 1,000 ft/min (304.8 m/min).
	Non-Operating	0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min).
Shock	Listed are the levels of shock the product can withstand with NO damage being incurred. The values represent peak input acceleration during a 2 to 3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.	
	Non-Operating	35G's (Half-sine Shock) 35G's (Trapezoidal Shock)
Vibration	Listed are the levels of vibration the product can withstand with NO damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range.	
	Operating	Random vibration at 5Hz@0.00025G ² /Hz, 10Hz@0.01G ² /Hz, 100Hz@0.01G ² /Hz, 300Hz@0.00001G ² /Hz 5Hz to 300Hz, (0.25G's nominal).
	Non-Operating	Random vibration at 0.008G ² /Hz, 10Hz to 500Hz, (2 Grms nominal).
Acoustic Noise	Listed are the declared A-WEIGHTED SOUND POWER LEVELS (LWAd) and declared average desktop seated operator position A-WEIGHTED SOUND PRESSURE LEVELS (LpAm) when the product is operating in a 73.4°F (23°C) ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).	
	IDLE (Fixed disk drive spinning)	LWAd = 4.3 Bels, Desktop Average LpAm = 32 dBA
	FIXED DISK (Random write)	LWAd = 4.8 Bels, Desktop Average LpAm = 37dBA
	CD-ROM (Sequential Reads)	LWAd = 5.0 Bels, Deskside Average LpAm = 39dBA

Service and Support

On-site Warranty^{Note 1}: One-year (1-1-1) limited warranty delivers one year of on-site, next business-day^{Note 2} service for parts and labor and includes free telephone support^{Note 3} 24 x 7. Global coverage^{Note 2} ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. One-year onsite and labor are not available in all countries.

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured Compaq and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.



After-Market Options

Communications

NICs

Intel PRO/1000 PT Gigabit PCIe Controller (full height) EH352AA

Wireless LAN

HP Wireless A+G PCI Card (North America only) EA118AA

HP Wireless A+G PCI Card (WW except North America) PZ928AA

Modems

Agere 2006 PCI High-Speed 56K International SoftModem EK694AA

Hard Disk Drives

HP 500-GB SATA 3.0-Gb/s Hard Drive PV943AA

HP 250-GB SATA 3.0-Gb/s Hard Drive PY278AA

HP 160-GB SATA 3.0-Gb/s Hard Drive PY277AA

HP 80-GB SATA 3.0-Gb/s Hard Drive PY276AA

Removable Storage Devices

Diskette Drive

HP 1.44-MB Internal Diskette Drive AG295AA

HP 1.44-MB USB Diskette Drive – External DC141B

16-in-1 Media Reader EM718AA

Input Devices

Keyboards

HP PS/2 Standard Keyboard DT527A

HP USB Standard Keyboard DT528A

Mice

HP USB 2-Button Laser Mouse GW405AA

HP PS/2 2-Button Optical Scroll Mouse EY703AA

HP USB 2-Button Optical Scroll Mouse DC172B

Memory

HP 2-GB PC2-6400 (DDR2-800 MHz) DIMM AH060AA

HP 1-GB PC2-6400 (DDR2-800 MHz) DIMM AH058AA

HP 512-MB PC2-6400 (DDR2-800 MHz) DIMM AH056AA

Audio

HP Satellite Speakers RD628AA

Graphics

NVIDIA GeForce 8400 GS 256MB SH PCIe x16 Graphics Card* GJ119AA

ATI Radeon HD 2400 XT 256MB DH PCIe x16 Graphics Card KD060AA

HP ADD2 SDVO DVI-D Adapter DY674A

* 1GB of system memory required. Graphics cards use part of the total system memory to enhance graphics performance.

Optical Drives

HP SATA CD-RW/DVD-ROM Combo Drive AH046AA

HP SATA DVD-ROM Drive AH047AA

HP SATA SuperMulti LightScribe DVD Writer Drive GF343AA

After-Market Options

Security	HP Business PC Security Lock Kit	PV606AA
	Kensington Security Lock	PC766A
Miscellaneous Accessories	HP FireWire / IEEE 1394 PCI Card	PA997A
Monitors*	CRTs	
	HP s7540 17" (16.0" vis) CRT Monitor	PF997AA#XXX
	HP v7650 17" (16.0" vis) Flat-face CRT Monitor	PF996AA#XXX
	TFTs	
	HP L1506 15" TFT Flat Panel Monitor – Analog only	PX848AA#XXX
	HP L1710 17" TFT Flat Panel Monitor - Analog only	GS917AA#XXX
	HP L1750 17" TFT Flat Panel Display - Analog/Digital	GF904AA#XXX
	HP L1755 17" TFT Flat Panel Display - Analog/Digital	PL777AA#XXX
	HP L1910 19" TFT Flat Panel Display - Analog only	GS918AA#XXX
	HP L1950 19" TFT Flat Panel Display - Analog/Digital	GG458AA#XXX
	HP L1955 19" TFT Flat Panel Display - Analog/Digital	PD974AA#XXX
	HP L2065 20" TFT Flat Panel Display - Analog/Digital	EF227A4#XXX
	HP LP2465 24" TFT Widescreen Flat Panel Display - Analog/Digital	EF224A4#XXX
	GSA Monitors	
	HP L717g 17" GSA Flat Panel Monitor	EE191AA#XXX
	HP L919g 19" GSA Flat Panel Monitor	EE192AA#XXX
	Options	
	HP Flat Panel Speaker Bar	EE418AA
	HP CRT Monitor Multimedia Base	PM552AA
	<i>*This is only representative, not an exhaustive list.</i>	

Memory

DDR SYNCH DRAM NON-ECC MEMORY

The Intel G33 Express chipset supports non-ECC DDR2 memory up to PC2-6400 (800-MHz). Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations.

CAUTION: You must shut down the computer **and disconnect the power cord** before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

HP recommends dual-channel symmetric configurations for maximum performance.

For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

STANDARD MEMORY

512-MB, 1-GB, 2-GB, or 4-GB DDR2 SYNCH DRAM

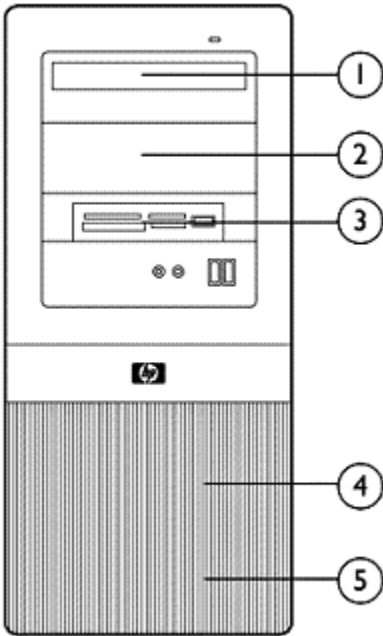
OPTIONAL MEMORY UPGRADES

Supports up to 8 GB of DDR2 SYNCH DRAM. Not all memory configurations possible are represented below.

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

	Channel A		Channel B	
DIMM Size	Slot 1	Slot 2	Slot 3	Slot 4
512-MB	512-MB			
1-GB	1-GB			
2-GB (dual-channel symmetric)	1-GB		1-GB	
4-GB (dual-channel symmetric)	1-GB	1-GB	1-GB	1-GB
4-GB (dual-channel symmetric)	2-GB		2-GB	
8-GB (dual-channel symmetric)	2-GB	2-GB	2-GB	2-GB

Storage



HP Compaq dx2400 Microtower Business PC

	Maximum Quantity Supported	Position Supported	Controller
Drive Support			
Diskette Drives	1	3	SIO
Media Reader	1	3	Internal USB 2.0 port
DVD-ROM Drives	2	1, 2	SATA
CD-RW/Combo Drives	2	1, 2	SATA
SuperMulti LightScribe DVD Writer Drives	2	1, 2	SATA
3.5" Serial ATA Hard Drives	2	4,5	SATA

Technical Specifications - Audio

Integrated Realtek ALC888S Audio	Type	Integrated
	HD Audio compatible	Yes
	codec	
	Sampling	Supports 48/96 KHz
	Audio Jacks	Mic-In Line-In Line-Out / Headphone Out
	Power Support	Digital: 3.3V Analog: 5V
Other	Meets performance requirements for audio on PC99/2001 systems High-performance DACs with 97dB SNR(A-Weighting) ADCs with 90dB NR(A-Weighting)	

Technical Specifications - Communications

Integrated Realtek 8111C-GR GbE Ethernet Controller	Controller	8111C-CG
	Memory	N/A
	Data rates supported	2.5GHz data rate with X1 link width
	Compliance	IEEE802.3, IEEE 802.3u, IEEE 802.3ab
	Bus architecture	PCExpress 1.1
	Data transfer mode	Half/Full Duplex Operation
	Hardware certifications	MS NDIS5, NDIS6, IPv4, IPv6, TCP, UDP
	Power requirement	1000mbps (heavy traffic) max. 588.5mW 100mbps (heavy traffic) max. 322.3mW 10mbps (heavy traffic) max. 278.3mW S3 with Link 195.8mW Link Down @S0 78.1mW Link Down @S3/S5 51.7mW
	Boot ROM support	EEPROM, 1Kb, 2Kb
	Network transfer rate	10/100/1000Mbps over CAT.5 100/1000Mbps over CAT.3 10Mbps over CAT.3
	Dimensions	9mm x 9mm
	Management capabilities	ACPI rev 2.0, PM rev 1.1, ASPM v1.0a
Intel PRO/1000 PT Gigabit PCIe Controller	Connector	RJ-45
	Controller	Intel 82572EI Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data rates supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus architecture	PCI Express 1.0a
	Data transfer mode	Bus-master DMA
	Hardware certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM support	Yes
	Network transfer rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus)
	Environmental	Operating temperature 32° to 131°F (0° to 55° C) Operating humidity 85% at 131° F (55° C)
	Dimensions	6.4 x 2.6 x 0.8 in (16.3 x 6.6 x 1.9 cm)
	Management capabilities	ASF, WOL, PXE, DMI, WFM 2.0.

Technical Specifications - Communications

HP Wireless A+G PCI	Dimensions	4.99 x 2.54 x 0.71 in (126.8 x 64.4 x 18.0 mm)	
	Weight	0.268 lb (65 g)	
	Controller	Atheros AR5414X chipset	
	system interface	PCI Spec 2.2	
	Network standard	IEEE 802.11a/b/g	
	Frequency band	5.1500 to 5.8500 GHz	
		2.4000 to 2.4835 GHz	
		2.4465 to 2.4835 GHz (Europe, Middle East, Asia and Asia Pacific – excluding Japan)	
		2.4000 to 2.4697 GHz (Japan)	
	Operating Temperature	32° to 140° F (0° to 60° C), operating	
	Storage temperature	-4° to 176° F (-20° to 80° C), non-operating	
	Humidity	10% to 85% non-condensing	
	Operating voltage	5V ± 5%	
	Power consumption	Tx/Rx peak 560/250mA @ 3.3V (max.)	
	Output power (approximately)	15 dBm ±2dB	
	Receive sensitivity	-90dBm at 11 Mbps (typical)	
	Data transfer rate	Standard rates of 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 48, 54 and Super AG Mode108-Mbps	
	Spreading	DSSS (Direct Sequence Spread Spectrum)	
	Security	64(40h) bit, 128(104h) bit, WPA, IEEE802.1X, AES-OCB, AES-CCM, Microsoft PEAP,TKIP, WEP	
	Antenna	External 5dBi antenna	
	Throughput	108 Mbps (only with Belkin 54G or 200 ft (60.96 m) – Indoor above router that supports 108 Mbps speed)	
		54 Mbps	200 ft (60.96 m) – Indoor
		11 Mbps	200 ft (60.96 m) – Indoor
	Certifications	Wi-Fi certified	
	Certifications for use by country	North America: United States, Canada	
		Europe: Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom	
		Australia, New Zealand	

Technical Specifications - Communications

Agere 56K PCI Modem	Data Transmission	56,000 Kbps maximum downstream data
		NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	Data Speeds	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/ 12,000/9,600/7,200/4,800/2,400/1,200/300
	Data Standards	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103
	Fax Speeds	14,400/12,000/9,600/7,200/4,800/2,400/300 b/s
	Fax Mode Capabilities	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
	Error Correction and Data Compression	V.44, 42bis, V.42 and MNP2-5
	Power Management	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
	Upgradeability	Driver upgradeable for future enhancements
	Video	ITU-T V.80 video ready interface
	Other	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
	Operating Temperature	32° to 158° F (0° to 70° C)
	Operating Humidity	20% to 90%, non-condensing
	Power	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
	Chipset	Agere Systems SV92PL – Integrated PCI interface with 5-V tolerant buffers and CardBus support
	Dimensions (L X H)	Complies with PCI low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets
	Connection	Single RJ-11 connector
	Other Features	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
	Safety	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
	EMC	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
	Telecom	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
	Health	Bare PCB material compliant to 94V-0 or better (marked as such)
	Other	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant

Technical Specifications - Graphics

Integrated Graphics Media Accelerator 3100	3D/2D Controller	Microsoft DirectX® 9 based with support for Pixel Shader 2.0, 4:1 anisotropic filtering, Gaussian texture filtering, shadow maps, volumetric textures, double-sided stencil buffers, and 4 pixel pipes.	
	VGA Controller	Integrated	
	Bus Type	PCI Express™ x16 (If an external graphics card is installed in a PCI or PCIe x1 slot, the internal graphics can be enabled or disabled using the system's BIOS setup utility. If a graphics card other than an SDVO/ADD2 card is installed in the PCI Express™ x16 slot, the internal graphics cannot be enabled).	
	RAMDAC	Integrated, 350 MHz (2048x1536@75 Hz)	
	Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed and system load. 8 MB is pre-allocated for graphics use at system boot time. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.	
		System memory equal or greater than 512 MB 8 MB pre-allocated + 248 MB DVMT = max frame buffer of 256 MB	
	Overlay Planes	Single overlay support with 5x3 filtering	
	Maximum Color Depth	32 bits/pixel	
	Maximum Vertical Refresh Rate	85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below.	
	Multi-display Support	Support for one CRT via the motherboard's VGA connector on SFF and MT. Support for an additional display on SFF/MT can be accomplished with the addition of SDVO/ADD2 option installed in PCIe x16 slot.	
	Graphics/Video API Support	Microsoft DirectX®9, DirectXVA®, VMR9, GDI/GDI+; OpenGL® 1.4.	
Resolutions Supported ¹	Resolution	Maximum Refresh Rate (Hz)	
		Analog Monitor	Digital Monitor
	640 x 480	85	60
	800 x 600	85	60
	1024 x 768	85	60
	1280 x 1024	85	60
	1600 x 1200	85	60
	1920 x 1080	85	60
	1920 x 1200	85	60
	1920 x 1440	85	N/A
	2048 x 1536	75	N/A

¹ Modes listed are supported with a single active display. The supported mode list for multiple active displays is a subset of this list. Not all modes will support video playback and some supported modes may use software MC (motion compensation) rather than hardware MC. Not all modes will support 3D acceleration depending on the system configuration (e.g., resolution selected, size of frame buffer, number of installed memory modules, etc.).

NOTE: Other resolutions and refresh rates may be selectable but are not recommended.

Technical Specifications - Graphics

NVIDIA GeForce 8400 GS (256 MB SH) PCIe x16 Graphics Controller	Bus type	PCI Express (x16 lanes)	
	Maximum vertical refresh rate	85 Hz	
	Display support	Integrated 400 MHz RAMDAC	
	Display max resolution	2048 x 1536 (analog), 2560 x 1600 (digital)	
	Input/Output connectors	DVI-I (DVI port supports dual-link and HDCP) TV-out (4 pin S-video)	
Board display options		DVI-I + TV DVI-I supports analog CRT or flat panel or digital flat panel (using DVI-A, DVI-D or DVI-I connector) DVI-I supports analog CRT or flat panel (with VGA connector and DVI-I to VGA dongle) TV connector is a 4-pin mini-DIN S-video connector	
Board configuration		Specification	Description
		Graphics Chip	NVIDIA GeForce 8400 GS
		Core clock	460 MHz
		Memory clock	200 MHz
		Frame buffer	256 MB DDR2
Languages supported		24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish	
Core power		25 W (Max board power)	

NVIDIA GeForce 8400 GS (256 MB SH) PCIe x16 Graphics Controller display resolutions and refresh rates
NOTE: Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP.

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	85 Hz
1920 x 1440	85 Hz
2048 x 1536	85 Hz
Digital Resolution	Maximum Refresh Rate
640 x 480	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1280 x 1024	60 Hz
1600 x 1200	60 Hz
1920 x 1200*	60 Hz
1920 x 1440**	60 Hz
2560 x 1600**	60 Hz

* Reduced blanking timings used when connected to a single-link DVI monitor

** Requires a dual-link DVI capable monitor

Technical Specifications - Graphics

HP ADD2 SDVO PCIe x16 DVI-D Adapter	Models	HP ADD2 SDVO DVI-D Out Adapter			
	Form Factor	Low-profile card			
	DVI-D Connector	Digital connection only			
	Dual Head Support	Yes, when used with the integrated VGA connector			
	Display Devices Supported	HP L1750 HP L1950 HP L2045W HP LP1965			
	NOTE: These graphics adapters offer optimal performance with any display that meets applicable VESA standards.				
	Color Depth	All modes support 8-bpp, 16-bpp, and 24-bpp color depths			
	Host Interface Connector	Mechanically compliant with PCI-E standard Complies with the Intel ADD2 and Intel Serial Digital Video Output (SDVO) specifications			
	Dot Clock	165 MHz maximum			
	Display Modes	Supports display modes that require up to 165-MHz bandwidth on the link, as shown in the following table.			
Resolution		60-Hz LCD	60-Hz	75-Hz	85-Hz
Blanking		5% reduced	GTF	GTF	GTF
640 x 480	VGA	Yes	Yes	Yes	Yes
800 x 600	SVGA	Yes	Yes	Yes	Yes
1024 x 768	XGA	Yes	Yes	Yes	Yes
1280 x 1024	SXGA	Yes	Yes	No	No
1600 x 1200	UXGA	Yes	Yes	No	No
ATI Radeon HD 2400XT (256MB DH) PCIe Graphics Card	Bus type	PCI Express (x16 lanes)			
	Maximum vertical refresh rate	85 Hz			
	Display support	Integrated 400 MHz RAMDAC			
	Display max resolution	2560 x 1600 digital, 2048 x 1536 analog			
	Board display options	Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output			
	Board configuration	Specification	Description		
		Graphics Chip	RV610		
		Core clock	650 MHz		
		Memory clock	500 MHz		
		Frame buffer	256 MB DDR2, 128 bit wide		
	Languages supported	24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish			
	Core power	21 W			
	Compliance standards	EMC Emissions: a) FCC Part 15, Subpart B – Unintentional Radiators, Class B Computing Devices for Home & Office Use b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of			

Technical Specifications - Graphics

Information Technology Equipment
c) Canadian Standard ICES-003 is equivalent to CISPR22
d) Taiwanese Standard BSMI
e) Japanese VCCI
f) Australian C-Tick
g) Korean (MIC)
EMC Immunity:
CISPR 24:1997/EN 55024:1998 – Information Technology
Equipment – Immunity Characteristics – Limits and Methods of
Measurement.

ATI Radeon HD 2400XT (256MB DH) PCIe Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP

Analog Resolution	Maximum Refresh Rate
640 x 480	85 Hz
800 x 600	85 Hz
1024 x 768	85 Hz
1280 x 768	85 Hz
1280 x 1024	85 Hz
1600 x 1024	85 Hz
1600 x 1200	85 Hz
1920 x 1080	85 Hz
1920 x 1200	75 Hz
1920 x 1440	85 Hz
2048 x 1536	75 Hz
Digital Resolution	Maximum Refresh Rate
640 x 480	60 Hz
800 x 600	60 Hz
1024 x 768	60 Hz
1280 x 768	60 Hz
1280 x 1024	60 Hz
1600 x 1024	60 Hz
1600 x 1200	60 Hz
1920 x 1200	60 Hz

Technical Specifications - Input Devices

HP PS/2 or USB Standard Keyboard	Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
		Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Electrical	Weight	2 lb (0.9 kg) minimum
		Operating voltage	+ 5VDC ± 5%
		Power consumption	50-mA maximum (with three LEDs ON)
		ESD	CE level 4, 15-kV air discharge
		EMI – RFI	Conforms to FCC rules for a Class B computing device
		MicrosoftPC 99 – 2001	Functionally compliant
	Mechanical	Languages	38 available
		Keycaps	Low-profile design
		Switch actuation	55-g nominal peak force with tactile feedback
		Switch life	20 million keystrokes (using Hasco modified tester)
		Switch type	Contamination-resistant switch membrane
		Key-leveling mechanisms	For all double-wide and greater-length keys
		Cable length	6 ft (1.8 m)
		Microsoft PC 99 – 2001	Mechanically compliant
	Environmental	Acoustics	43-dBA maximum sound pressure level
		Operating temperature	50° to 122° F (10° to 50° C)
		Non-operating temperature	-22° to 140° F (-30° to 60° C)
		Operating humidity	10% to 90% (non-condensing at ambient)
		Non-operating humidity	20% to 80% (non-condensing at ambient)
		Operating shock	40 g, six surfaces
		Non-operating shock	80 g, six surfaces
		Operating vibration	2-g peak acceleration
		Non-operating vibration	4-g peak acceleration
		Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
		Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
		Approvals	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
		Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS

Technical Specifications - Input Devices

HP USB 2-Button Laser Mouse	Scroll Wheel	24
	Maximum Rotation Speed	48 rats/sec
Environmental	Switch Type	wheel
	Switch Life	Button – 3,000,000 Wheel – 1,000,000 times Tilt switch – 500,000 times
	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)
	Operating Humidity	10% to 90% (non-condensing at ambient)
	Non-operating Humidity	20% to 80% (non-condensing at ambient)
	Operating Shock	40 g, six surfaces
	Non-operating Shock	80 g, six surfaces
	Operating Vibration	2-g peak acceleration
	Non-operating Vibration	4-g peak acceleration
Electrical	Operating Voltage	+ 5VDC ± 5%
	Power Consumption	
	MTBF	> 150,000 hrs
	ESD	IEC-61000-4-2 criteria B, Contact discharge: +/- 4kV, Air discharge: +/- 8kV
	EMI-RFI	FCC Class B
Mechanical	PC98	PC 99 Compliant
	Resolution	800dpi
	Tracking Speed	25 cm/sec
	Acceleration	0.5mm
	Switch Actuation	0.6N (60gf)
	Switch Life	Button – 3,000,000 Wheel – 1,000,000 times Tilt switch – 500,000 times
	Cable Length	1850mm
	PC98-99	PC99 compliant
Regulatory Approvals	UL60950-1, UL 94, UL 746 (A-E), UL 796	
	TUV/GS: EN 60950-1, EN 60825-1	
	FCC Class B, UL 1950, cUL, TUV GS, CE, C-tick, VCCI, BSMI, RRL	

Technical Specifications - Input Devices

HP PS/2 Optical Scroll Mouse	Dimensions (H x L x W)	3.95 x 6.21 x 11.7 cm (1.56 x 2.44 x 4.61 in)
	Weight	4.44 oz (126 g)
Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
		-4° to 140°F (-20° to 60° C)
	Operating humidity	10% to 90% (non condensing at ambient)
		10% to 90% non condensing
	Operating shock	40 g, 6 surfaces
		80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
		4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
	Electrical	Operating voltage
		5 VDC ± 10%
	Power consumption	100mA
		PS/2 mini-din connector
Mechanical	ESD	CE level 4, 15 kV air discharge
		Conforms to FCC rules for a Class B computing device
	EMI-RFI	Functionally compliant
		400 ± 20% DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
		100 in/s/s (2.54 m/s/s)
	Acceleration	61 g nominal peak force
		3,000,000 operations (using Hasco modified tester)
	Switch actuation	61 g nominal peak force
		3,000,000 operations (using Hasco modified tester)
	Switch life	Low force micro-switches
		155 mi (250 km) at average speed of 10 in/s
	Tracking mechanism life	6 ft (1.8 m)
		Microsoft PC99 – 2001
Scroll wheel	Cable length	Mechanically compliant
		8 mm
	Width	1.01 in (25.6 mm)
		48 rats/sec
	Diameter	48 rats/sec
	Maximum rotation speed	Light force micro-switch
		1 million operations
	Switch type	Minimum 200,000 revolutions
	Switch life	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC
	Mechanical life	
Regulatory approvals	Compliant	

HP USB Optical Scroll Mouse	Dimensions (H x L x W)	1.5 x 4.5 x 2.5 in (3.8 x 11.6 x 6.3 cm)
	Weight	0.27 lb (0.12 kg)
	Cable length	72.8 in (185 cm)



Technical Specifications - Hard Drives

Serial ATA Hard Drives 80 GB (7200 rpm)	Capacity	80,026,361,856 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.9 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	32° to 140° F (0° to 60° C)	
160 GB	Capacity	160,041,885,696 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	32° to 140° F (0° to 60° C)	
250 GB	Capacity	250,059,350,016 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm) Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Drives

500 GB	Capacity	500,107,862,016 bytes	
	Height	1 in (2.54 cm)	
	Width	Media diameter: 3.5 in (8.89 cm)	
		Physical size: 4 in (10.2 cm)	
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	Single Track	2.0 ms
		Average	11 ms
		Full-Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Optical Storage

SATA DVD-ROM Drive	Height	5.25-inch, half-height, tray-load			
	Orientation	Either horizontal or vertical			
	Interface type	SATA/ATAPI			
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)			
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)			
	Weight (max)	2.6 lb (1.2 kg)			
	Read speeds	DVD+R/-R/+RW/-RW/+R DL /-R DL	Up to 8X		
		DVD-ROM	Up to 16X		
		DVD-RAM	Up to 4X		
		CD-ROM, CD-R	Up to 48X		
	CD-RW	Up to 32X			
Removable Storage - Media Compatibility - DVD-ROM	Media	Read	Write		
	CD-ROM	Yes	No		
	CD-R	Yes	No		
	CD-RW	Yes	No		
	DVD-ROM	Yes	No		
	DVD-ROM DL	Yes	No		
	DVD-RAM	Yes	No		
	DVD+R	Yes	No		
	DVD+R DL	Yes	No		
	DVD+RW	Yes	No		
	DVD-R	Yes	No		
	DVD-RW	Yes	No		
	DVD-R DL	Yes	No		
	Access times (typical reads, including setting)	Random	DVD: < 140 ms (typical), CD: < 125 ms (typical)		
		Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)		
Cache Buffer		2 MB (minimum)			
Data Transfer Modes		ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)			
Power	Source	SATA DC power receptacle			
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p			
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC -< 600 mA typical, < 1400 mA maximum			
Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)			
	Relative Humidity	10% to 90%			
	Maximum Wet Bulb Temperature	86° F (30° C)			

Technical Specifications - Optical Storage

SATA CD-RW/DVD-ROM Combo Drive	Height	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speeds	CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	DVD+R/-R/+RW/-RW/+R DL /-R DL	Up to 8X
		DVD-ROM	Up to 16X
		CD-ROM, CD-R	Up to 48X
		CD-RW	Up to 32X
	Access times (typical reads, including setting)	Random	DVD: < 140 ms (typical), CD: < 125 ms (typical)
		Full Stroke	DVD: < 250 ms (typical), CD: < 210 ms (typical)
	Power	Source	SATA DC power receptacle
		DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC -< 600 mA typical, < 1400 mA maximum
	Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)

HP SATA SuperMulti LightScribe DVD Writer Drive	Height	5.25-inch, half-height, tray-load	
	Orientation	Either horizontal or vertical	
	Interface type	SATA/ATAPI	
	Disc capacity	8.5 GB DL or 4.7 GB standard	
	Dimensions (W x H x D)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	Weight (max)	2.6 lb (1.2 kg)	
	Write speeds	DVD-RAM	Up to 12X
		DVD+R	Up to 16X
		DVD+RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-R	Up to 16X
		DVD-RW	Up to 6X
		CD-R	Up to 48X
		CD-RW	Up to 32X
	Read speeds	DVD-RAM	Up to 12X
		DVD+R/-R/+RW/-RW/+R DL /-R DL	Up to 8X



Technical Specifications - Optical Storage

	DVD-ROM DL	Up to 8X
	DVD-ROM, DVD+R, DVD-R	Up to 16X
	CD-ROM, CD-R	Up to 48X
	CD-RW	Up to 32X
	Random	DVD: < 140 ms (typical), CD: < 125 ms (typical)
Access times (typical reads, including setting)	Full Stroke	DVD: < 250 ms (seek), CD: < 210 ms (seek)
Power	Source	SATA DC power receptacle
	DC Power Requirement	5 VDC \pm 5%-100 mV ripple p-p 12 VDC \pm 5%-200 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC -< 600 mA typical, < 1400 mA maximum
Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 90%
	Maximum Wet Bulb Temperature	86° F (30° C)

Technical Specifications - Removable Storage

1.44-MB Diskette Drive	Size	3.5 in (8.89 cm)		
	LED Indicators (front panel)	Green		
	Read/Write Capacity per Diskette (high/low)	1.44 MB/720 KB		
	Drive Height	One-third		
	Drive Rotation	300 rpm		
	Transfer Rate (high/low)	500/250 KB/s		
	Bytes/Sector	512		
	Sectors/Track (high/low)	18/9		
	Tracks/Side (high/low)	80/80		
	Access Times	Track-to-Track (high/low)	3/6 ms	
		Average (high/low)	94/173 ms	
		Settling Time	15 ms	
		Latency Average	100 ms	
	Cylinders (high/low)	80/80		
	Read/Write Heads	Two		
HP 16-in-1 Media Card Reader	USB interface	USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board		
	Advance protocol support	<ul style="list-style-type: none">• Supports hardware ECC (Error Correction Code) function• Supports hardware CRC (Cyclic Redundancy Check) function• Supports MS 4-bit parallel transfer mode• Supports MS-PRO 4-bit parallel transfer mode• Supports SD 4-bit parallel transfer mode• Supports high-speed 50 MHz SD 4-bit card (version 1.1)• Support high-speed 52 MHz MMC 8-bit card (version 4.x)		
	Supported media types	<ul style="list-style-type: none">• Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II),MicroDrive (MD)• Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), xD-Picture Card (xD)• Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard (MMC), Secure MultiMediaCard (Secure MMC), ROM Type MultiMediaCard (MMC ROM), Reduced Size MultiMediaCard (RS MMC), MultiMediaCard 4.0 (MMC Plus), Reduced Size MultiMediaCard 4.0 (MMC Mobile)• Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo)		
	Mechanical	Length (3.5")	124.7 cm	
		Width (3.5")	101.6 cm	
		Height (3.5")	25.4 cm	
		Length (5.25")	171.6 cm	
		Width (5.25")	148.9 cm	
		Height (5.25")	42.7 cm	
	Environmental	Operational environmental extremes	Test Parameters/Conditions – Power applied, unit operating on system ±5% nominal supply voltage.	



Technical Specifications - Removable Storage

- 10°C 10% R.H. ≥ 24 hours
- 10°C 90% R.H. ≥ 24 hours
- 20°C 90% R.H. ≥ 24 hours
- 30°C 90% R.H. ≥ 24 hours
- 40°C 90% R.H. ≥ 24 hours
- 50°C 90% R.H. ≥ 24 hours
- 50°C 10% R.H. ≥ 24 hours

Storage environmental extremes Test Parameters/Conditions
60°C @ 80% R.H. for 96 hours
-30°C @ 20% R.H. for 48 hours
No power applied
Delta °C < 1.0°C/min
Delta % R.H. < 1.5% R.H./min

Approvals

USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only
Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O
Connectivity Design Guide V. 1.2
FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T

Technical Specifications - Environmental Data

Eco-Label Certifications & declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

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